# A Critical Look at "Liquified" or "Vaporized" 9/11 Plane Theories

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By Rick Rajter — Graduate Student, MIT
Department of Materials Science and Engineering

*Only puny secrets need protections.*
*Big discoveries are protected*
*by public incredulity.*
*- Marshall McLuhan*

For the EXTREMELY impatient, go to the executive summary here (link section 6)

**1. Purpose of This Paper**

This article hopes to refute any and all claims that the lack of plane evidence from the alleged impact of flight 93 on 9/11 was a result of the aluminum being "liquified" or "atomized." I present all of my calculations and assumptions so that others can check my work and verify it for themselves.

I must say that I'm a little embarrassed for having to actually sit down and write this article up. I don't want to come across as elitist or condescending, but the conclusions I draw in this analysis are so obvious, I feel it's the equivalent of telling a person that their heart is still beating. Nevertheless, friends and scientists that I know personally and respect greatly have actually stated, with straight faces and genuine sincerity, that liquefaction or atomization is a possibility. However, most of these people have spent no more than 15 total minutes examining the official story, so I do not think they would truly believe such conjectures if they actually sat down and cranked out the numbers. I keep dreaming of the day when the scientists and experts of the world stop postulating all of these amazingly complex new models and explanations to hold the official story together. Beliefs, politics, and pride prevent them from picking up a piece of chalk and discovering these errors.

This is not intended to be a "smoking gun" report, but it merely exposes yet another major distortion in the official story. The calcs presented can be done by anyone who has taken and can still use basic algebra. I chose to be explicit rather than hand wave the calculations in order to be as thorough as possible.

**2. Terminology**

There is a major difference between "liquefaction" and "atomization" of a material like aluminum. It is critical to understand the difference, because there is an enormous energy difference between these 2 states. To turn room temperature aluminum to a liquid, the temperature must first rise to the melting temp Tmelt. After this, an additional amount of energy, the heat of fusion or HeatF, is required to change the state from a solid to a liquid. To get the aluminum to a gas, we would repeat the process from the liquid starting point. The liquid aluminum would need to be heated to the boiling point before the additional energy, the heat of vaporization or HeatV, is used to change it to a gas.

The only other parameter of importance is the heat capacities: CpSolid and CpLiquid. The heat capacity used in this article is the amount of energy (joules) required to raise the temperature of a quantity (1 kg) by 1 degree (celcius).

**3. Methodology**

There are only 3 sources of energy possible for a jet impact: Jet fuel, kinetic energy, and oxidation reactions. I will mainly focus on the kinetic energy that comes from the speed of the plane, as it is the primary reason used by those who argue these "liquefaction" and "atomization" theories. For those that insist on taking the jet fuel into account, appendix A goes into the many details on why the assumptions, required to utilize this as a source to raise the temperature, are too unrealistic and violate years of existing empirical evidence. As for oxidation reactions (e.g. a thermite like reaction), these will be completely ignored for lack of a sufficient reactant source (iron oxide, aka "rust", or a large quantity of basic water as claimed by Greening http://www.911myths.com/WTCTHERM.pdf), lack of empirical precedent for such an occurrence, and lack of support for such an explanation in line with the official government story.

Figure 1: The impact of flight 93 had no large quantity of rust (iron oxide) or basic water (ph >10) available. Therefore, exothermic oxidation reactions are highly unlikely.

5 cases will be analyzed:
Case A: Temperature raised after impact at 500 miles per hour.
Case B: Velocity required to raise temperature to Tmelt
Case C: Velocity required to melt aluminum
Case D: Velocity required to melt aluminum, then raise temperature to Tboil
Case E: Velocity required to melt aluminum, then vaporize it to a gas.

Here I repeat all my assumptions to ensure clarity and to eliminate misinterpretation:
-100% of the kinetic energy will be utilized. Thus, no energy is lost to sound, light, radiation, convection, diffusion, etc.
-The energy conversion upon impact is instantaneous and only injected into the plane.
-No jet fuel will be used here for reasons listed in Appendix A
-The heat capacities remain constant only for a given phase (solid or liquid).
-I analyze on a PER KG basis. That is, upon crashing, the entire plane slows down to 0 velocity and each piece of aluminum heats up uniformly. I can (and will) easily calculate non-uniform cases, but any non-uniform distribution of the heat will actually weaken the case of the plane being TOTALLY liquefied or atomized. Non-uniform heating would mean that some parts of the plane are hotter, but other parts are colder! In order to eliminate all the aluminum via vaporization, the temperature would need to be uniform.

**4. Parameters**
Sourced http://aluminium.biography.ms/

| | |
|---|---|
| Tmelt | = 660 Celcius |
| Tboil | = 2518 Celcius |
| HeatF | = 399926 Joules/per kg |
| HeatV | = 10874700 Joules/per kg |
| CpSolid | = 900 Joules/(per kg * per degree C) |
| CpLiquid | = 1100 Joules/(per kg * per degree C) |

**5. Calculations**

So far, so dull. But now that we have the basics covered, we can get into the meat of the matter. The only formula required is the kinetic energy equation.

KE = 1/2 mass * velocity^2

Where KE is measure in joules, mass in kilograms, and velocity in meters per second. I will list results in other formats too, so that those who like measurements in "tons" and "miles per hour" don't feel too in the dark.

Case A:

Velocity = 500 MPH = 223 meters/second

The calc is quite simple here. KE = 1/2 * 1 * 223^2 = 24980 joules
Divide by the heat capacity CpSolid to get
Temp increase = KE/CpSolid = 24980/900 = 27 degrees Celcius =~ 50 degrees Fahrenheit

Thus, in case A, we have maximum theoretical temperature (under the assumptions listed in section 2) that isn't large enough to cook hot dogs on a grill in a reasonable amount of time. Thus, in order to get any appreciable temperature rise, we will need more speed!

Case B, C, D, E

Here, we look at it from the opposite viewpoint. We know the energy required to bring each kg of material up to the states listed in cases B through E (up to melting temp, melted, up to vaporization temp, vaporized). Thus, we can use these values to calculate the minimum velocity required for these 4 scenarios.

Rearranging the KE equation, we get

Velocity= (2 * KE / mass)^(0.5)

Using the parameters in section 3, I obtain the following energy requirements (all in joules).

| | |
|---|---|
| Case B | ~576,000 |
| Case C | ~976,000 |
| Case D | ~3,149,000 |
| Case E | ~14,024,000 |

More explicitly (for those who want is spelled out). The energy requirements are as follows:

| | |
|---|---|
| Case B = (660-20)*900 | =~ 576,000 |
| Case C = (660-20)*900+399000 | =~ 976,000 |
| Case D = (660-20)*900+399000+(2518-660)*1100 | =~ 3,149,000 |
| Case E = (660-20)*900+399000+(2518-660)*1100+10800000 | =~14,024,000 |

Substituting these energies back into the kinetic energy equation, we get the following velocities:

| | meters/second | MPH | Mach |
|---|---|---|---|
| Case B | 1073 | 2400 | 3.1 |
| Case C | 1397 | 3125 | 4.1 |
| Case D | 2509 | 5614 | 7.3 |
| Case E | 5296 | 11847 | 15.6 |

For my final calculation, I will determine just how much aluminum we could liquify or vaporize using all the kinetic energy available from the entire plane. This is actually quite simple. All I need to do is take the kinetic energy (KE) available per kg in Case A, and divide it by the energy required to liquify a kg in Case C and vaporize a kg in Case E. This ratio will give the maximum theoretical quantity of liquefiable or vaporizable material.

KE Case A / KE Case C = 24980/975,926 = 0.02559 = 2.6%
KE Case A / KE Case E = 24980/14024000 = 0.00178 = 0.2%

Thus, at worst, no less than 99.8% of the plane should have be recoverable. The 2.5% that had the potential of liquefaction (under the extreme assumptions that 100% of the kinetic energy injected into a small portion of the available aluminum) would have cooled in the same general area upon impact. Therefore, it was recoverable. This, again, is an absurd conversation to even have because the average temperature could not have increased by more than 28 degrees Celsius from the available kinetic energy.

## 6. Discussion

It should be stated, that case E, which I have concluded as the ONLY scenario with enough available kinetic energy to completely eliminate the evidence, requires the plane flying at speeds 15 times faster than the speed of sound. This is by no means trivial. Many billions of dollars are spent yearly on developing military planes that operate effectively in any of these ranges. Mach 15 is more than 3 times faster than bullets coming from the highest powered commercial guns available.
http://hypertextbook.com/facts/1999/MariaPereyra.shtml

One might venture a guess that a plunging 757 might be able to achieve Mach 1 — although this would most likely tear a 7X7 up in mid air because they are certainly not designed for such speeds. Even so, the maximum average temperature increase by Mach 1 speeds would be only 65 degrees C (120 degrees F), which is still almost 600 degrees C shy of even REACHING the melting point.

The situation gets even worse for the steel/titanium alloys found in the engines, which have larger heats of fusion and vaporization.

## 7. Conclusion

Although the KE of a plane can certainly inflict damage upon a target (whether planned or accidental), it is safe to conclude that there is not nearly enough energy to cause any substantial rise in temperature for the plane under the assumption of uniform heat distribution. The maximum theoretical quantity of "vaporized" aluminum, under the extreme assumption of all the kinetic energy being concentrated into a small sections of the aluminum exterior, is an almost unnoticeable 0.2% at 500mph. Therefore, it is scientifically infeasible that any liquefaction or atomization occurred and all or most of the material should have been recoverable.

## 8. Executive Summary

I have done some basic calculations using the kinetic energy of a moving plane to determine maximum theoretical temperatures induced via a plane crash.
I have concluded, based on my assumptions and parameters, that the maximum average temperature could not have increased by more than 28 degrees Celsius.
To achieve 100% liquefaction, speeds larger than Mach 4.1 are required under the assumptions in section 3.
To achieve 100% vaporization or "atomization", speeds larger than Mach 15.5 are required under the assumptions of section 3.
At 500 MPH, there is only enough available kinetic energy to "vaporize" 0.2% of the aluminum under some fairly questionable assumptions.
Other sources of energy are available, but are either trivial, or have no realistic means of heating the aluminum upon crashing.

This analysis only proves that the plane parts could not have disappeared due to vaporization caused via the kinetic energy of the planes. It does not specifically accept or deny that these planes or flights exist. It merely adds to an ever expanding collection of analyses that show the official story of 9/11 is filled with many fabrications.

## A. Appendix - What about jet fuel?

Jet fuel certainly is large source of energy. Nobody, including myself, would contest this. As little as 10,000 gallons can easily move a 100 ton plane from NY to LA. Sure, I could include it into my calculations with some stipulations, but I will not do so for 2 reasons:

First: It's bad enough to have to calculate speeds of Mach 15+ to show that the "vaporizing aluminum plane" arguments have no credibility. It's a whole new level of insanity to make assumptions that require the fuel to burn completely, and have absolutely 100% of the energy inject itself into the aluminum. To even calculate this quantity, is to give credence to the mere fact that it can happen. I contend that it cannot.

Secondly, I just know someone would take that quantity out of context (i.e. without mentioning all the detailed assumptions required with it) and post it as fact in some forum, some newsgroup, etc. We already have so much disinfo and bad information that I don't even want to give them the ammunition.

To be thorough, here are the reasons why I believe inclusion of jet fuel into the calculations is a non-issue.

1) Upon impact, most of the juel would be burned in an ensuing fireball.
2) As the fuel burns, it expands and cools as per the ideal gas law P*V=n*R*T.
3) All the fuel is held in the wing. Most of the fuel would never come into contact with any part of the fuselage.
4) While the fuel is burning, the heat is also radiating out to space, conducting through the aluminum to cooler areas, convecting away via the wind, etc. It is not just clinging to the plane.
5) Flight 93 (allegedly) crashed and spread its debris out over many square miles of space. Certainly, the fuel did not disperse with the aluminum parts in exactly the correct locations and in the correct proportions.
6) NO PLANE CRASH EXPLANATION HAS EVER NEEDED EXCUSES LIKE "VAPORIZED" ALUMINUM BEFORE. Ever! Just like every other experiment, we would need some proof that this has happened before, and can happen again. Evidence for either case is not available, as far as I can tell.
7) The boiling point of aluminum is approximately 2000 degree Celsius greater than the temperature of normal hydrocarbon flames.